NOTES ON AUSTRALIAN DIPTERA. No. ii.

By J. R. Malloch.

[Read 28th May, 1924.]

Family MUSCARIDAE.

Subfamily ANTHOMYIINAE.

Genus Hylemyia Robineau-Desvoidy.

This genus is most abundantly represented in the northern hemisphere and especially in Europe and the northern and mountainous sections of North America. Africa and South America have so far produced very few representatives of the genus and only 3 are known to me as occurring in Australia, one of these, *cilicrura* Rondani, being of world-wide distribution.

It is possible that collecting in forested mountainous sections may yet produce more Australian species, though those already known will probably be found to be associated with cultivated crops, which is certainly the case with *cilicrura*.

I present herein a key for the identification of the three species known to me. Failure to associate one of the species with any already described has compelled me to describe it as new. The type and allotype specimens will be returned to Dr. E. W. Ferguson.

The complete sixth wing-vein, presence of a bristle at base of hind metatarsus on its ventral surface, and of fine sparse soft hairs on the ventral surface of scutellum will serve to distinguish the genus from its allies in Australia. The thorax has 2 + 3 dorsocentral bristles, the first posterior cell of wings is very slightly narrowed at apex, and the lower calyptra is smaller than the upper.

Key to Australian species of Hylemyia.

1. Wing with conspicuous black spots as follows: at apex of first vein, junction of second and third veins, on fourth vein at base of discal cell, and on both extremities of both cross-veins; thorax with three broad brown vittae, the median one extending over scutellum .. .. *deceptiva* Malloch.

   Wing without black spots; thorax not, or indistinctly, vittate 2

2. Hind tibiae of male with a series of erect setulose hairs on posteroventral surface from base to apex, which are as long as diameter of tibia; hind femur in same sex with some strong bristles on apical half of anteroventral surface, the posteroventral surface unarmed, fore tibia with a stout curved blunt-tipped spur at apex on posterior side; hind tibia in both sexes with about six anterodorsal bristles of irregular lengths; prealar bristle distinct .. .. *cilicrura* Rondani.

   Hind tibia in male without erect posteroventral hairs, femur with long fine bristles on entire length of anteroventral surface, the tips of which are

very fine, and a series of similar but weaker bristles on posteroventral surface, which do not extend to apex, fore tibia with a short sharp-tipped straight bristle at apex on posterior side; both sexes with two or three anterodorsal and two posterodorsal bristles; prealar bristle absent .. .. *urbana*, n.sp.

Hylemyia deceptiva Malloch.

I have seen a large series of specimens of this species from Illawarra and Botany Bay, N.S.W., sent to me by Dr. C. F. Baker, Philippine Islands. Originally described from New Zealand, Sydney, N.S.W., and Adelaide, S.A.

Readily distinguished from its allies by the spotted wings. Length, 4-5 mm.

Hylemyia cilicrura Rondani.

I have but two females of this species before me from Australia. It has been recorded also by Stein. The species is very widely distributed, the larvae feeding in the sprouting seeds of maize, beans, etc. Same size as last species.

Hylemyia urbana, n.sp.

Male and female.—Black, densely covered with brownish-grey pruinescence. Thorax faintly or not at all vittate with brown. Abdomen with a series of dark spots in middle of dorsum, which are rather indistinct in male and sometimes absent in female. Interfrontalia on female rufous in front, darker above. Legs black. Wings hyaline. Calyptrae whitish. Halteres yellow.

Male.—Frons linear above; arista pubescent; parafacial about as wide as third antennal segment, and narrower than height of cheek. Thorax with a sparse double row of presutural hairs and no prealar bristle. Abdomen depressed, as in *cilicrura*, none of the segments with abnormal armature. Fore tibia with one or two posterior and one anterodorsal setula beyond middle; mid tibia with one anteroventral, one anterodorsal, one or two posterodorsal, and two posteroventral bristles; hind femur as described in key; hind tibia with two or three anterodorsal, two posterodorsal, and from two to four anteroventral bristles, the last very short. First posterior cell of wings slightly narrowed apically; costal thorns both distinct.

Female.—Frons fully one-third of the head width, with a pair of cruciate interfrontal bristles. Tibiae as in male, but the hind femur with sparse anteroventral bristles which do not extend to base, and the posteroventral surface bare.

Length, 4 mm.

Type, male, allotype, eight male, and one female paratypes, Sydney.

One female from Sydney has three posterodorsal and two anterodorsal bristles and may represent another species, but more material is necessary to warrant a decision.

Subfamily PHAONIINAE.

It is becoming more and more difficult to separate the so-called families Muscidae and Anthomyiidae of authors, and it is evident to me that, while within any one of the larger faunal regions of the world it is not impossible to designate characters which will serve for that purpose, it is impossible to make these or any other set of characters apply to the whole complex when the whole world's fauna is considered. I have in fact dropped the family Anthomyiidae in preference to Muscaridae or Muscidae in all of my recent papers, using subfamily groups of which Muscinae or Muscarinae will form one.

The separation of Phaoniinae and Muscarinae is difficult, and it may be necessary yet to consider these groups as forming one subfamily as the limits

are very difficult to arrive at. There are, however, in the former, no species which have the fourth vein of the wings angularly bent forward at or before the middle of its last section as in typical *Musca*, the bend when present occurring beyond the middle, and the lower calyptra in Muscarinae is almost invariably noticeably truncate at apex, while in the other group it is narrower and more distinctly rounded, with its inner posterior angle well separated from the anterior lateral angle of scutellum, which is not the case in Muscarinae.

Dichaetomyia armata Stein.

Male and female.—Fulvous yellow, distinctly shining. Frons black, with white pruinescence, interfrontalia paler, brownish in female; antennae and palpi yellow, third segment of former whitish pruinescent in male, a little darkened in female. Thorax with three whitish pruinescent vittae on dorsum, giving it the appearance of being quadrivittate with rufous yellow. Apex of abdomen in male more or less infuscated. Legs entirely tawny yellow. Wings, calyptrae and halteres yellowish.

Male.—Eyes bare; frons over twice as wide as third antennal segment, orbits distinct, each with six or seven bristles, the upper three or four curved backward; parafacial eliminated below when head is seen from the side; cheek narrow; longest hairs on arista about twice as long as width of third antennal segment. Thorax with 2 + 4 dorsocentral bristles; prealar short; hypopleura hairy below spiracle. Fore tibia with one long fine posterior bristle at middle; mid femur normal; mid tibia with rather dense black hairs on ventral surface that are longer than diameter of tibia, and two long fine posterior bristles; hind femora swollen from near base, at base of swollen part, about one-fourth from base of femur, on ventral surface with a dense clump of short black downwardly directed bristles, the apices of which are flexed towards apex of femur, a very long strong thorn at one-third from apex on same surface, which is as long as from its base to apex of femur, sloped towards base of femur, and curved at tip, some of the anterior bristles also strong; hind tibia slightly curved, with one anterodorsal median bristle and some fine black anteroventral and posterodorsal hairs or setulae. Wings normal.

Female.—Frons nearly one-third of the head width, upper two orbitals on each side backwardly directed. Fore tibia with one anterodorsal and one posterior median bristle; mid tibia with or without a short anterodorsal bristle, with two bristles and some short setulae on posterior side; hind femur with one or two strong preapical anteroventral bristles; hind tibia with two anterodorsal, two or three anteroventral bristles and a few posterodorsal setulae. Otherwise as male.

Length, 7 mm.

Originally described from an unrecorded locality in a key which does not give sufficient data to make the identification of the species absolutely certain, but, owing to the fact that I have what is evidently the same species from the Philippines, I accept the name for this species even should Stein's name be considered a *nomen nudum*. I suspect that *Mydaea rigidiseta* Stein, described from New Guinea, is merely this species, the type having but three pairs of postsutural dorsocentrals and the abdomen with black spots. I have one such specimen from Queensland before me now.

Localities.—Glenreagh, N.S.W., February 1, 1923, Coramba-Dorrigo Rd., 1,000 feet, January 31, 1923; Eidsvold, Queensland.

PHAONIA UMBRINERVIS Stein.

Male and female.—Black, slightly shining, with drab-coloured dusting. Mesonotum, when seen from behind, with four narrow black vittae. Abdomen, when viewed from behind, with an elongate black spot on each tergite, forming an interrupted central vitta, less noticeable in female. Legs black. Wings slightly smoky, both cross-veins broadly black. Calyptrae greyish. Knobs of halteres fuscous.

Male.—Eyes almost bare; narrowest part of frons about one-eighth of the head width, orbits linear, with long setulae on anterior half; parafacials silvery, nearly as wide as third antennal segment; cheek one-third as high as eye; arista sparsely plumose, the longest hairs as long as width of third antennal segment; palpi normal, slender. Thorax with dorsocentrals 2 + 3; prealar absent; both intra-alars long; acrostichals in two series, three pairs in front of suture, one pair conspicuous; sternopleurals 1:2; hypopleura bare. Abdomen elongate ovate; basal sternite bare, fifth with a deep rounded posterior emargination. Fore tibia without a median posterior bristle; mid tibia with two posterior bristles; hind femur with a complete anteroventral and posteroventral series of bristles, the latter the weaker; hind tibia with two anterodorsal and three or four anteroventral bristles, the calcar of moderate length. Both costal thorns distinct; venation normal.

Female.—Differs from the male in having the frons about one-third of the head width, one upper orbital directed backward, hind femur without posteroventral bristles.

Length, 3.5-5 mm.

Originally described from one immature male from Botany Bay. I have before me a male from Sydney, July 15, 1923, and a female also from there, October 8, 1922.

PHAONIA FERGUSONI, n.sp.

Male.—Black, slightly shining. Thorax and abdomen rather densely grey pruinescent, the former with four broad black vittae, the latter with a dorsocentral black stripe which tapers apically. Legs black. Wings hyaline. Calyptrae gray, margins and fringes black. Halteres black.

Eyes densely haired; frons about one-ninth of the head width, orbits linear, setulose on their entire length, strongly so anteriorly; antennae missing in type; parafacial broad, over half as wide as height of cheek, the latter about one-fourth as high as eye. Thorax with 2 + 3 dorsocentrals, two pairs of closely placed fine presutural acrostichals, the prealar short, scutellum normal, hypopleura bare, sternopleurals 1:2. Abdomen elongate-ovate, basal sternite bare or almost so. Fore tibia unarmed at middle; fore tarsus without erect sensory hairs; mid tibia with two posterior bristles; hind femur with a series of fine closely placed bristles on entire length of anteroventral surface, longer apically; hind tibia with four or five irregular anterodorsal bristles, the anteroventral surface with a series of long setulae, and the posterodorsal bristle rather short. Wing normal, outer cross-vein much curved.

Length, 11 mm.

Type, Mill, Allyn River, December 18, 1922 (Goldfinch).

The foregoing are the only two species which are definitely known as belonging to this genus from Australia. Stein has doubtfully referred *stupida* Walker here, but it may readily be separated from either, if it really is a *Phaonia*, by the reddish femora and tibiae, bluish abdomen, and the presence of four pairs of postsutural dorsocentrals.

As in the case of *Hylemyia,* this genus is most abundantly represented in Europe and North America, there being comparatively few species in South America, about half a dozen in Africa and none so far as I know in New Zealand. There are about 50 in North America, some of which occur also in Europe, where there are about the same number.

Some of the larvae occur under bark of fallen trees, and one is parasitic.

Genus Helina Robineau-Desvoidy.

The species which I have referred to *Helina* from Australia fall into several more or less well marked groups, but in most cases these groups are slightly different from those found in Europe and North America. The species related to *addita* Walker are in many respects similar to the *duplicata* group found in these regions, but there are rather dense hairs on the eyes, which are not found as a rule in the European species which possess four sternopleural bristles. I note that there is a very decided tendency in the Australian and New Zealand species of some genera in this family to have the eyes hairy, whereas in other regions the allies of these species do not have the hairs or they are very indistinct.

Europe does not furnish any blue or green species of this genus, while there are many such species in Australia. The presence of fine hairs upon the hypopleura is a character which has been considered of sufficient importance to use as a differentiating character for the families Muscidae and Anthomyiidae by recent authors, but in many species of Anthomyiidae there are quite evident hairs on the hypopleura and, in some cases, I have concluded that they may be absent or present even in the same species. It is pertinent to note that some of the blue species referred to have these hairs and others do not, a condition which is found also in the other groups to some extent.

Possibly future workers on the family will arrive at a means of classification which will take into consideration the immature stages and biology while linking these up with characters which are not as yet evident to us and so arrive at a better understanding of the relationships of the groups. However, in the meantime, we must perforce rely upon characters which appear to associate rather diverse forms together and, under existing circumstances, there appears to be no recourse other than to adopt for the Australian species the generic name above used.

As limited here we have species which possess the following characters: Sixth wing-vein incomplete, not extending to margin of wing; hind tibia without a strong bristle beyond middle on posterodorsal surface; lower calyptra much larger than upper; wing veins bare, fourth not appreciably bent forward apically; fore femur not thorned at apex below in male; cruciate frontal bristles absent in female.

Helina calyptrata, n.sp.

Male.—Head black, parafacials silvery. Thorax black, with distinct white pruinescence and quadrivittate. Abdomen greenish-blue, with conspicuous whitish pruinescence, the sides of dorsum slightly checkered. Legs black. Wings rather noticeably brownish along costa, especially in subcostal cell and at inner crossvein. Calyptrae white, margin of lower one yellowish. Knob of halteres fuscous.

Eyes distinctly hairy; narrowest part of frons narrower than third antennal segment; arista plumose; cheek twice as high as width of third antennal segment. Thorax with 2 + 3 dorsocentrals; prealar very short; strong presutural acro-

stichals absent; some fine hairs below metathoracic spiracle. Basal abdominal sternite bare. Fore tibia without a median posterior bristle; mid tibia with two posterior bristles; hind femur with rather short bristles on apical half of anteroventral surface and a series of short setulose hairs on posteroventral; hind tibia with two anterodorsal and one very short anteroventral bristle. Outer cross-vein curved, at about its own length from inner. Lower calyptra narrower than usual.

Female.—Similar to male, the eyes with very short hairs and the wing-veins rather noticeably yellowish margined, the outer cross-vein as distinctly so as the inner.

Length, 6-6.5 mm.

Type, male, Austinmer, N.S.W., December 19, 1921. Allotype, Sydney, October 29, 1922.

HELINA FLAVOFUSCA, n.sp.

Female.—Head black, with grayish pruinescence. Thorax reddish-yellow, with a poorly defined dorsocentral fuscous vitta. Abdomen brownish fuscous, with grayish pruinescence, the anterior lateral angles of tergites more or less flavous. Legs reddish-yellow, tarsi black. Wings, calyptrae, and halteres yellowish.

Eyes bare; frons a little less than one-third of the head width, orbits narrow, two upper bristles on each side curved backward; arista plumose. Dorsocentrals 2 + 3; one or two pairs of short widely separated presutural acrostichals present besides the short hairs; hypopleura bare; prealar very short. Fore tibia without a median posterior bristle; mid tibia with two posterior bristles; hind femur with about three anteroventral bristles on apical third; hind tibia with one anterodorsal and one anteroventral bristle. Venation normal, last section of fourth vein about 1.5 as long as preceding section.

Length, 5-6 mm.

Type, Sydney, July 21, 1923. Paratype, Sydney, May 19, 1923.

HELINA IMITATRIX, n.sp.

Female.—Head black, face, cheeks, and orbits whitish pruinescent, interfrontalia black, when seen from in front white pruinescent; basal two antennal segments tawny, third black; palpi tawny, infuscated apically. Thorax tawny, centre of disc with a broad poorly defined fuscous vitta, the usual 4 vittae reddish-brown but not very distinct; scutellum darker at base; a fuscous spot on upper anterior part of pteropleura; postnotum dark in centre. Abdomen fuscous, densely pruinescent, the dorsum checkered. Legs tawny, tarsi black. Wings grayish hyaline, both cross-veins rather broadly clouded. Calyptrae and halteres yellowish.

Eyes sparsely hairy; frons normal; arista with very short hairs; cheek about twice as high as width of third antennal segment; palpi normal; proboscis much stouter than usual. Thorax with 2 + 4 dorsocentrals and at least one pair of strong closely placed presutural acrostichals; prealar short but distinct; both intra-alars strong; sternopleurals 1:2. Abdomen normal. Fore tibia with a posterior median bristle; mid femur with about three ventral bristles at base; mid tibia with three posterior bristles; hind femur with two or three preapical anteroventral bristles; hind tibia with two anterodorsal and two to four anteroventral bristles. Outer cross-vein straight; first posterior cell slightly widened apically; both costal thorns distinct.

Length, 7 mm.

Type, Lorne, Victoria, October 23, 1918 (F. E. Wilson).

Limnophora opacifrons, n.sp.

Female.—Head black, opaque, with dense white pruinescence on face, cheeks, and orbits, occiput lavender-gray pruinescent except in centre where it is brown; interfrontalia when seen from in front whitish, from the side brown in middle and black on sides. Mesonotum and pleura lavender-gray pruinescent, the former with five dark brown vittae, the pleura dark brown on upper margin; scutellum dark brown. Visible tergites 1 to 3 each with a pair of very large transverse fuscous brown spots which are narrowly separated in middle and extend entirely across dorsum at posterior margin leaving only a transverse gray pruinescent area on each side anteriorly; fourth tergite with a large irregular central mark of same colour. Legs black, with grayish pruinescence. Wings clear. Calyptrae white. Halteres yellow.

Eyes almost bare; frons one-fourth of the head width; each orbit with two recurved upper bristles; face concave; cheek higher than width of third antennal segment; arista very shortly pubescent; palpi slightly broadened. Thorax with 2 + 4 dorsocentrals; both intra-alars distinct; sternopleurals 1:1 or 0:1. Abdomen without genital thorns. Fore tibia without a median posterior bristle; mid tibia with one posterior bristle; hind femur with one preapical anteroventral bristle; hind tibia with one anterodorsal bristle. First posterior cell of wing hardly narrowed apically; last section of fourth vein about 2.5 as long as preceding section; outer cross-vein curved, slightly deflected towards base of wing at upper margin, and at its own length from inner.

Length, 5 mm.

Type, Coramba-Dorrigo Rd., 1,000 feet, N.S.W., January 31, 1923.

Limnophora nigriorbitalis, n.sp.

Female.—Similar to *opacifrons*. Differs in having the entire frons including orbits opaque black when seen from the side; the face silvery; mesonotum with the vittae fused so that only the lateral margins are pale gray pruinescent; and the black abdominal spots are not separated in middle.

The species is more slender and even less strongly bristled than is *opacifrons*. Thoracic dorsocentrals 2 + 3. Bristles of legs as in last species, but the hind femur in type has no preapical anteroventral bristle. Wings narrower than in *opacifrons*, but in other respects similar, except that the outer cross-vein is directed slightly towards apex instead of base of wing at its upper extremity. In both species the setulae at base of third wing-vein are very fine and short.

Length, 4 mm.

Type, same as last species.

Limnophora orthoneura, n.sp.

Male.—Head black, with silvery pruinescence, that on interfrontalia visible only when seen from in front. Thorax shining black, densely whitish pruinescent on dorsum except on two large subquadrate marks in front of suture and a broad transverse mark behind suture which shows traces of divided vittae along its posterior margin when seen from behind; scutellum gray pruinescent at apex. Abdomen with basal tergite entirely black, a pair of large subtriangular fuscous spots on second and another on third visible tergites, fourth with a less distinct

central brownish mark. Legs black. Wings hyaline. Calyptrae white. Halteres yellow.

Eyes bare; frons one-third of the head width; face concave in profile, vibrissal angle not projecting beyond level of base of antennae; cheek not as wide as third antennal segment; parafacial linear in middle; arista pubescent, thickened on basal half, hardly longer than antenna. Thorax with 2 + 3 dorsocentrals; mesonotal hairs rather strong. Abdomen elongate ovate; hypopygium small. Fore tibia unarmed at middle; mid femur with two or three posteroventral bristles near base; mid tibia with two posterior bristles; hind femur with two strong preapical anteroventral bristles; hind tibia with one anterodorsal and one anteroventral bristle. First posterior cell not narrowed at apex; inner cross-vein but little beyond middle of discal cell; outer cross-vein straight, at not more than half its own length from apex of fifth; last section of fourth vein not over 1.5 as long as preceding section.

Female.—Similar to male, arista longer, abdomen pointed at apex.

Length, 3 mm.

Type, Belaringar, N.S.W., May 31, 1923. Allotype, Fish River, N.S.W., March 25, 1923.

This species belongs to the *triangula* group, in which the eyes are widely separated in the male. There are some closely related species in Formosa and elsewhere in the Orient, some of which have yet to be described, though they were included in a key to oriental species published by Stein some years ago.

Genus Atherigona Rondani.

This genus has usually been placed in the subfamily Coenosiinae but it belongs without doubt in the Phaoniinae, though an aberrant group.

Atherigona tibiseta, n.sp.

Male.—Testaceous yellow, subopaque. Third antennal segment and arista fuscous brown; palpi yellow; interfrontalia orange; frontal orbits whitish pruinescent; occiput dark gray on upper half, with yellowish pruinescence. Disc of mesonotum, scutellum and metanotum fuscous, densely gray pruinescent; humeral angles broadly yellowish, mesonotum with a faint brown central vitta. Abdomen with a brownish mark in centre of first visible tergite and a pair of large elongate black spots on second and third. Legs yellow, bases of fore tarsi darker. Wings hyaline. Calyptrae and halteres yellow.

Arista almost bare, moderately thickened on more than the basal half; palpi short and stout, with three or four short black bristles at base of each on their outer sides, the apical hairs pale. Thorax normal. Abdomen normal, first and second visible tergites equal, third about half as long as second; hypopygial prominence short, with a slender process on each side directed backward and tapered a little at tips, and below the level of these, which are separated by a distance about equal to their length, there is an almost indistinguishable wart or short process in centre. Fore tarsus with a few short erect fine hairs along the anterior side of basal segment and one or more similar hairs at apices of the other segments, which are about as long as the diameter of the segments; fore tibia with about eight long black hairs on apical half of ventral surfaces, the longest of which are as long as basal segment of fore tarsus; fore femur normal for the typical group; mid and hind legs as in genotype. Inner cross-vein at about two-fifths from base of discal cell; first posterior cell not noticeably narrowed at apex; outer cross-vein erect.

Length, 3 mm.

Type, Sydney, April 2, 1923 (Mackerras).

There is no other species of the genus so far described which has the fore tibia as in this one. Several Indian and African species have fine hairs on the fore tarsi in the males. These hairs are not present in the females.

Subfamily FANNIINAE.

Genus EURYOMMA Stein.

This genus may be distinguished from *Fannia* by the widely separated eyes of the male, the frons being one-third of the head width. There is but one strong presutural dorsocentral bristle instead of two and the prealar bristle is not duplicated.

The presence of one or two setulose hairs on hind coxa above base of femur, the abbreviated sixth and seventh wing-veins with the seventh longest and curved round the apex of sixth, and the fact that the two upper orbital bristles on each side of frons are directed outward over eyes, will separate the genus from others occurring in Australia.

EURYOMMA PEREGRINUM Meigen.

Black, densely yellowish-gray pruinescent. Basal two antennal segments, palpi, legs except tarsi, and the abdomen tawny yellow; third antennal segment and tarsi black.

Arista almost bare. Postsutural dorsocentrals 3 pairs, the anterior one short. Fore tibia with a very short anterodorsal setula beyond middle; mid tibia with one anterodorsal and one posterodorsal bristle; hind femur with two strong preapical anteroventral bristles; hind tibia with one anteroventral, one anterodorsal and one posterodorsal bristle close to middle. Lower calyptra hardly protruded.

Length, 2.5-3.5 mm.

One female, Sydney, July 26, 1923.

A cosmopolitan species. Probably the larva lives in decaying vegetable matter.